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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/772,858	01/31/2001	Akitumi Kanijima	033211-002	2102

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10/01/2004

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EXAMINER

OLSEN, ALLAN W

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 10/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/772,858

Applicant(s)

KAMIJIMA, AKIFUMI

Examiner

Allan Olsen

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 10, 2004 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-9 and 19-27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. The originally filed specification does not disclose a process wherein a strippable film is formed on the whole surface of a thin film to be patterned include.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 6, 8-11, 17-20, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,055,220 issued to Mamin et al. (hereinafter, Mamin).

Mamin teaches using an ion beam to pattern SiN as well as a layer of PMMA. Mamin teaches depositing a layer of aluminum over a patterned SiN/photoresist bilayer, after which, Mamin teaches removing the photoresist layer.

Mamin does not explicitly teach patterning the strippable layer together with the layer to be patterned by using focused ion beam (FIB) etching.

It would have been obvious to one skilled in the art to pattern the photoresist of Mamin's figure 10C-10E with FIB because Mamin teaches patterning PMMA with FIB and PMMA is a well known photoresist. In Mamin's step 10D, it would have been obvious to one skilled in the art to pattern the SiN layer of figure 10A together with the PMMA (photoresist) layer because Mamin teaches that both layers may be patterned by FIB etching and this obvious variant of the method depicted in Mamin's figures 10A-10F requires one less step because the FIB patterning step of 10B could be entirely eliminated.

Claims 1, 8-10, 17-19, 26 and 27 are rejected under 35 U.S.C. 103(a) as obvious over US Patent 5,506,197 issued to Nakamura et al. (hereinafter, Nakamura) in view of Mamin.

Nakamura teaches depositing a strippable SiO₂ film (15) upon Au layer (14) (figure 3D). Nakamura teaches selectively etching the SiO₂ layer, the Au layer and an underlying oxide superconductor (figure 3E and column 6, lines 34-38). Nakamura teaches that the patterning process shown in figures 3D and 3E includes photolithography and selective etching. Nakamura teaches removing the SiO₂ layer (column 11, line 25). However, before removing the patterned SiO₂, Nakamura teaches depositing an oxide layer (10) and a superconducting channel (20) over the SiO₂ layer (figure 3G).

Nakamura does not teach the type of etching that is used for the selectively etching that is depicted in figures 3D and 3E.

Mamin teaches that optical, e⁻-beam and FIB are functionally equivalent lithographic techniques.

With the exception of steps that relate to patterning by the lift-off method, each time Nakamura refers to etching, Nakamura teaches ion beam etching. In the event that one skilled in the art did not understand Nakamura to teach the use of FIB etching for the patterning depicted in figures 3D and 3E, it would have been obvious because Nakamura consistently teaches that ion beam etching may be used to pattern such layers and Mamin teaches that FIB lithography is equivalent to photolithography.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,377,437 issued to Taylor et al. (hereinafter, Taylor).

Taylor teaches forming a mask layer (which corresponds to applicant's claimed strippable film) over a layer that is to be patterned by plasma etching. Taylor teaches patterning the mask layer by plasma etching. Taylor teaches that the source of the plasma (which is used by Taylor to etch both the mask layer and the underlying layer) may be a reactive ion beam (column 3, lines 38-46). Taylor teaches the mask layer may comprise an inorganic or an organic layer. Taylor teaches the mask layer may comprise metallic material. Taylor teaches an organic mask layer may be a conductive organic layer or an insulating organic layer or an insulating organic layer that is treated in a manner that creates a conductive top layer. Taylor teaches grounding the conductive layer. Taylor teaches the process may be used to make magnetic memory devices.

Taylor does not teach removing the strippable film or mask layer.

It would have been obvious to one skilled in the art to remove the mask layer of Taylor because masking layers are typically removed and Taylor teaches no utility of such a layer after fulfilling its function as an etch mask.

Claims 11-16 and 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable Nakamura and Mamin as applied to claim 10 above, and further in view of Taylor.

As the material that correspond to Applicant's strippable layer, Nakamura does not teach using: an insulating organic material (claims 11, 20); a conductive organic

material (claims 12, 21); or an insulating organic material with an overlying, grounded, conductive layer (claims 13-16, 22-25).

For a strippable layer, Taylor teaches using as one of; an organic based silicon oxide, a conductive organic layer, and an insulating organic material with an overlying grounded conductive layer.

It would have been obvious to one skilled in the art to use the strippable layers taught by Taylor in place of the silicon oxide of Nakamura because Taylor teaches that silicon oxide and the other claimed strippable layers are functionally equivalent with some providing the additional benefit of dissipating charge build-up during the ion beam patterning step.

Response to Arguments

Applicant's arguments filed June 10, 2004, pertaining to Taylor have been fully considered but they are not persuasive. Applicant argues that the ion beam of Taylor is used to form an ion implantation pattern rather than being a focused ion beam used to etch. However, Taylor teaches patterning by plasma etching and Taylor teaches using a FIB plasma (column 3, lines 38-46).

Applicant's other arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

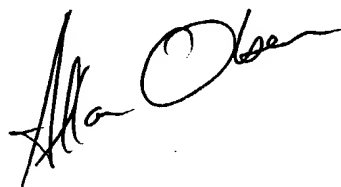
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. The examiner can normally be reached on M-F 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Greg Mills can be reached on 571-272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Allan Olsen', with a stylized flourish at the end.

Allan Olsen
Primary Examiner
Art Unit 1763